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AMERICAN

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CONTRIBUTIONS TO THE HISTORY OF WAGE STATISTICS.[1]

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I. UNOFFICIAL INVESTIGATIONS OF THE STATISTICS OF WAGES.

The earliest attempts to present information relating to wages were altogether unofficial in character; and consisted either of conjectural estimates concerning national income and its division, or of simple statements of wage rates in given occupations at definite times. Of the first class, Gregory King's "Scheme of the Income and Expence of the several Families of England, calculated for the Year 1688" may serve as an early example.[2] Of the second class, the data given in Adam Smith's "Wealth of Nations are Typical."[3]

In the economic and statistical literature of the present century considerable attention has been devoted to the collection of data relating to the earnings and condition of wage-earners. Census statistics, probate records, returns of income taxes in various countries, statistics of the tax on rentals in Paris, and other sources of a similar nature have been drawn upon for information concerning the distribution of income among the various social classes; while quotations of actual or average wages have been sought with increasing assiduity. Unofficial investigations may still be divided into two classes, which, in some measure, resemble the earlier writings upon the subject of wages.

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[1] The materials for this article were gathered during the course of an investigation which the writer was requested to make concerning the federal census and wage statistics. They are now published as a mere contribution to the history of wage statistics, in the hope that they may be of some value to workers in that field. The writer regrets that the publications of the various state labor bureaus could not be given more adequate treatment, but it was impossible under the circumstances to describe the work done in most of the states.

[2] Gregory King's Natural and Political Observations upon the State and Condition of England was reprinted by George Chalmers, 1810. The table in question may be found in Charles D'Avenant's Works, ii, 184 (London, 1771).

[3] J. E. T. Rogers's edition, i, 73, 78, 80, 81, 108, 109.

In the first class may be placed the writers who not only study statistics of wages, but also attempt to form estimates of the aggregate or relative incomes of various social classes. Of English writers, we may mention Dudley Baxter, Leone Levi, and Robert Giffen.[1] While they present large collections of statistical data concerning wages, these writers pass beyond the sphere of the collection and presentation of ascertained facts. Among French writers, Leroy-Beaulieu must be included in this class.[2] In the United States, Mr. Charles B. Spahr should be mentioned.[3]

The writers of the other class confine themselves more strictly to the ascertainment of statistics of wages, and have industriously collected a considerable body of such data.[4] Tooke and Newmarch, as well as Porter, published a large amount of material concerning English wages;[5] while the monumental work of Thorold Rogers will long remain a leading source of information.[6] More recently Charles Booth's investigations have furnished a mass of wage statistics for the city of London.[1] Of the various unofficial studies concerning comparative wages in England at different periods, a careful discussion by Mr. A. L. Bowley should perhaps be accorded the highest rank.[2] In France, we should mention the well-known work by Chevalier upon wages in the present century.[3] In Germany, von der Goltz has studied the wages of agricultural laborers.[4] Since 1880 some of the German labor unions have collected, more or less systematically, statistics of wages.[5] Careful, detailed studies of wage statistics in particular trades and localities have been made by Bauer and Schullern-Schrattenhofen;[6] while a cursory glance at the statistical and economic journals shows a number of other investigations.[7] In recent years official statistics, collected in accordance with the law for sick insurance, have yielded data that have been utilized by Lange and Hirschberg.[8]

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[1] R. Dudley Baxter: The National Income (London, 1868). L. Levi: Wages and Earnings of the Working Classes (London, 1885). R. Giffen: Progress of the Working Classes, in his Essays in Finance. Second Series (London, 1887).

[2] P. Leroy-Beaulieu: Essai sur la répartition des richesses, chaps. 16 and 19 (Paris, 1881). See also a writer in the *Journal de la société de statistique de Paris*, 1890, 225-240.

[3] Charles B. Spahr: The Present Distribution of Wealth in the United States, especially 119-129 (New York, 1896.)

[4] We shall not consider the "individual monographs" prepared by Le Play and his followers. These contain much information concerning family earnings, but the materials are in such a form as to make statistical comparison and classification a work of extreme difficulty.

[5] Thomas Tooke and William Newmarch: History of Prices (1837-1857). G. R. Porter; Progress of the Nation, ii, 122, 243, 264 (1838).

[6] J. E. T. Rogers: History of Agriculture and Prices in England (1866-1887).

Concerning the methods employed by the first class of writers it may be said that, in the present condition of statistical science, trustworthy data are lacking for any exact computations of the aggrégate incomes of the various social classes. On this point only the most uncertain estimates are possible. Such economists as Giffen and Leroy-Beaulieu have certainly presented much valuable statistical information concerning both nominal and real wages, but it cannot be said that any great degree of certainty attaches to their conclusions concerning the relative incomes of social classes. Of the investigations of the second class it can not be claimed that all possess equal value. Some of the wage statistics here presented are evidently mere averages, gathered sometimes in an uncritical manner. But others are actual quotations of wages, which have been carefully classified and worked into such a form that they are useful for statistical purposes. The investigations of Bauer and Schullern-Schrattenhofen are pre-eminently of this character. Also the paper by A. L. Bowley is noteworthy as a careful attempt to select data that shall be fairly comparable, and shall throw light upon the course of English wages during a period of thirty years. Enough has been accomplished by such unofficial investigations to show the erroneous character of Meitzen's opinion[1] that wages "are susceptible only of estimate."

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[1] Labour and Life of the People (1889-1897).

[2] A. L. Bowley: Changes in Average Wages in the United Kingdom between 1860 and 1891, in *Journal of Royal Statistical Society*, lviii, 223-285.

[3] E. Chevalier: Les Salairies au xix siècle (1887). Scattered data of wages in various countries may be found in the *Journal de la société de statistique de Paris*. See Index, 1860-1889.

[4] Die ländliche Arbeiterfrage. Second edition (1884).

[5] See extract from the *Vossische Zeitung*, published in U. S. Consular Reports, xli, 70-71.

[6] See Bauer, in *Jahrbücher für Nationalökonomie und Statistik*, lxvii, 889. Schullern-Schrattenhofen, in *Zeitschrift für Volkswirthschaft, Socialpolitik, und Verwaltung*, v, 1-61.

[7] See *Zeitschrift des preussischen statistichen Bureaus*, 1868, pp. 326-351; 1875, pp. 391-401; 1876, pp. 235-239. See also *Jahrbücher für Nationalokonomie und Statistik*, xviii, 125-147; xlvii, 160-169; lix, 97-116. For Holland, see reference to article published by Dutch Statistical Institute in 1886, in *Quarterly Journal of Economics*, vi, 155.

[8] E. Lange, in *Archiv für soziale Gesetzgebung und Statistik*, vi, 1-13. E. Hirschberg, in *Jahrbücher für Nationalokonomie und Statistik*, xliv, 263-271; lxi, 870-877; lxii, 740-746.

II. OFFICIAL INVESTIGATIONS OF WAGE STATISTICS IN FOREIGN COUNTRIES.

The necessary field of wage statistics is so broad that there can be little doubt of the insufficiency of private investigations by economists and statisticians. Accordingly various governments have undertaken the collection of data relating to work and wages. In this department American investigators have less to learn from European examples than in many other branches of statistical science. Nowhere have official statistics of wages been more fully developed than in the United States. European censuses differ in scope from our own, and have generally paid no attention to wage statistics; while, in the establishment of bureaus of labor statistics, this country has led the way. Yet the earliest official wage statistics that possess any scientific value are to be found in Belgium.

In that country a census of industrial statistics, including the subject of wages, was taken in 1846. This investigation was under the administration of the great Quételet, and contained many noteworthy features.[1] Some of these deserve detailed consideration.

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[1] A. Meitzen: History, Theory, and Technique of Statistics, translated by Falkner, 183 (Philadelphia, 1891).

The census included only those laborers who worked in factories and shops, and excluded domestic workers. Such a narrowing of the field of inquiry added greatly to the value of the results, since the best industrial statistics are gathered in the large industries. Then great care was taken in the reduction of quotations of piece wages. Reports were secured concerning the wages of 317,812 hired laborers, and the returns were thoroughly classified according to the age and sex of the workers. Further than this, the adult workers and the children were separately graded according to the daily wages received, the grades varying from a daily wage of fifty centimes or less up to wages of five francs or more. Thus the census presented a valuable body of wage statistics, classified according to the age and sex of the laborers as well as the daily rates of wages.

It was not until 1880 that an attempt was made to repeat the investigation conducted so successfully by Quételet. In that year another inquiry was made;[2] but, unfortunately, the methods and scope were so different from those of the earlier census that the two bodies of statistics are partly, if not wholly, incomparable. In 1880 reports were secured concerning 384,069 laborers, but these were all in large industries, workers in shops being excluded. This omission of the shop workers, included in 1846, may have improved the quality of the statistics collected in 1880; but it makes comparisons of the two investigations difficult. But, more than this, the later inquiry has a different classification of industries, and a different classification of workers by ages. Finally, the census of 1880 failed to classify the laborers by sexes, so that the returns secured have far less value than they might have possessed.

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[1] An account of this census may be found in the *Bulletin de l'institut international de statistique*, 1892, part i, 73–74.

[2] *Bulletin de l'institut international de statistique*, 1892, part i, 74–78.

Statistics of agricultural wages were collected in Belgium in 1846, 1856, 1866, and 1880. The last inquiry groups the wages paid by districts. In 1888 a commission of labor gathered some information concerning wages and family budgets, but the results were incomplete and lacked uniformity.[1] This is the usual result of investigations conducted by a commission that attempts to call witnesses, and to gather wage statistics from the testimony secured in this manner. American statisticians may congratulate themselves that such methods have been more favored in Europe than in this country.

Until the last ten or twelve years, European countries, with the exception of Belgium, seem to have accomplished but little in the collection of wage statistics. Inquiries by commissions seldom produced even satisfactory materials for investigation, and the results achieved can hardly be dignified with the name "statistics." The English Board of Trade had published data upon wages that had been based upon returns from local chambers of commerce.[2] But such reports left much to be desired. In 1886, however, an increased interest in labor statistics began to be shown by the establishment of official bureaus for the study of topics relating to labor. This was seventeen years after the formation of the first state labor bureau in the United States, and two years after the passage of the act for the establishment of the United States Department of Labor.

A labor correspondent was added to the English Board of Trade in 1886, and several reports upon labor topics were issued during the next few years.[3] One of the first tasks undertaken was the compilation in a single volume of all the wage statistics scattered through the English blue books.[1] But inadequate provisions were made for the work of the correspondent. The staff of the office was inadequate, and small appropriations made it impossible to collect materials in any way except by sending out letters of inquiry, — a method which the experience of all countries has shown to be unsatisfactory if it is desired to secure a large body of accurate data. In 1893, therefore, it was necessary to reorganize the work; and the Labor Department was formally established. More liberal appropriations have made it possible to employ trained agents in gathering the statistics, and a series of important reports has appeared. In the work of the Labor Department in the field of wage statistics a strong feature is the careful classification of wages actually paid, that will in time furnish a large mass of comparable data of the highest importance.

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[1] These results were reprinted by the English Board of Trade. See Parliamentary Papers, c. 5269 of 1888.

[2] See Parliamentary Papers, c. 5172 of 1887, p. i.

[3] Upon the Labor Department of the Board of Trade see D. A. Schloss, in *Journal of Royal Statistical Society*, lvi, 44–61 ; Palgrave, Dictionary of Political Economy, ii, 519–520 ; *Quarterly Journal of Economics*, i, 376–377, vii, 359–362 ; *Journal of Royal Statistical Society*, lvi, 330–332 ; *Bulletin de l'institut international de statistique*, 1887, part i, 179 ; 1895, part ii, 244.

Of the present publications of the Labor Department the student of statistics will be most interested in the reports upon yearly changes in rates of wages and hours of labor in the United Kingdom. For this purpose materials are gathered from many sources, and carefully sifted, verified, and criticized. In doubtful cases special agents make investigations. A "change in wages" is defined[2] as "a change in the weekly or hourly rate of remuneration of a certain class of workpeople, apart from any change in the nature of the work performed." Thus the Department attempts very properly to exclude, as confusing and misleading, the following cases: (1) Changes in average earnings of a trade, due not to altered rates, but merely to accidental changes in the proportions of higher and lower skilled workmen. (2) Changes due to promotion of a laborer, or to his degradation to a lower class of work. (3) Seasonal changes, regularly occurring in some trades at certain seasons, in which a lower wage is accompanied by a proportional change in the hours of labor. (4) Changes in terms of employment, providing for extra compensation for extra work, and *vice versa.* From these data the department can compute the number of separate individuals whose wages are raised or lowered during the year, and the amounts of such changes. For 1894 and subsequent years the investigations have included even rates of agricultural wages.

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[1] A list of the publications of the Labor Department is given in Palgrave, Dictionary of Political Economy, ii, 519-520.

[2] See Parliamentary Papers, c. 8075 for 1896, pp. x-xi. On the methods and results of these reports, see also Parliamentary Papers, c. 7567 for 1894.

In Switzerland, provision was made for the *Secrétariat Ouvrier Suisse* in September, 1886; and work was commenced the following year.[1]

In France, wage statistics were published annually by the government,[2] but these were made up from schedules sent out to the various prefects who filled them with mere estimates of wages, often of a purely conjectural character.[3] In the year 1891, however, an "*Office du Travail*" was established, and more adequate provision was made for labor statistics.[4] The office has, as a rule, employed special agents; and has sent them to the establishments where materials were to be sought. At first there was manifested a tendency to overload the schedules, which comprised seven pages of questions relating to wages, etc. But, following the example of American bureaus, the number of questions has been reduced.[5] In 1897 the office completed a large work in four volumes, containing statistics of wages and prices from 1840 to the year of publication.[6] During this period of more than half a century wages appear to have doubled, and a part of the increase has occurred since the year 1873, when the great fall of prices commenced. The results of this report are conveniently summarized in a series of index numbers.

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[1] Handwörterbuch der Staatswissenschaften, Supplementband, i, 146; *Bulletin de l'institut international de statistique*, 1895, part ii, 244; *Bulletin of United States Department of Labor*, i, 108.

[2] See Annuaire statistique de la France, 1887, pp. 403-410; 1888, pp. 279-286; 1889, pp. 221-264; 1890, pp. 213-264.

[3] Bertillon: Cours de statistique, 322.

[4] Handwörterbuch der Staatswissenschaften, Supplementband, i, 146; Bertillon: Cours de statistique, 320; *Economic Journal*, ii, 385-387; *Journal des Economistes*, fifth series, vii, 249, 315, 316.

[5] Bertillon: Cours de statistique, 321-323.

[6] This report has been reviewed at length in the *Quarterly Journal of Economics*, xiii, 106-109.

The year 1894 saw the establishment of labor bureaus in Belgium and in Spain.[1] In the former country this action had been preceded by the appointment of a superior council of labor for the investigation of various labor problems.

In other European countries, the establishment of labor departments has been urged at times, but such projects have not been carried out. In Germany, the lack of any systematic official returns concerning wages has often been regretted, and plans for the collection of wage statistics have been formulated. Von Meyr has urged that this work should be conducted by the office of labor insurance, while von Scheel thinks that the task would best be intrusted to the present statistical office of the Empire.[2] A single investigation concerning wages in Berlin was undertaken by the statistical office of Berlin in 1887, and a somewhat similar inquiry was made in Breslau at about the same time.[3] In 1892 there was organized a Commission for Labor Statistics, composed of public officials and delegates from the Reichstag. This body, which is far from being an independent statistical bureau, has held several inquiries, and has taken testimony concerning various labor questions. Since it can not extend such an examination to all institutions of a given class, it is necessary to deal only with cases that are deemed fairly typical. Upon the basis of the evidence thus gathered, the Commission formulates plans and recommendations for regulating industry. It has nothing to do, however, with the technical details of tabulating and publishing the results of the inquiries. This work is done by the Imperial Statistical Bureau.[1]

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[1] *Bulletin de l'institut international de statistique,* 1895, part ii, 224; Handwörterbuch der Staatswissenschaften, Supplementband, i, 146.

[2] On this discussion see Handwörterbuch der Staatswissenschaften, Supplementband, i, 146–148; *Allgemeines statistisches Archiv,* ii, 133, 142, 228, 229, iii, 320, 321; K. Frankenstein, Zur Organisation der amtlichen Lohnstatistik im Deutschen Reiche (1889); *Archiv für sociale Gesetzgebung,* iii, 700, 701.

[3] *Archiv für sociale Gesetzgebung und Statistik,* iii, 196–205; *Journal of Royal Statistical Society,* li, 823–826.

In Austria little has been accomplished in the collection of official wage statistics. The need of such work was strongly urged by Inama-Sternegg in 1892;[2] and two years later a plan for a bureau of labor statistics, with strictly limited powers, was brought forward.[3] The scheme seems to have encountered strong opposition from privileged classes, and to have failed of adoption. Perhaps the nature of this opposition was reflected in the requirement that the proposed labor office should not investigate the industries of agriculture, forestry, or mining. In 1895, however, there appeared a report upon agricultural wages in Austria.[4] This inquiry was instituted by the Ministry of Agriculture, and the returns were edited by Inama-Sternegg. Information was secured by sending written questions into various districts, and then compiling and digesting the answers thus received.[5]

In Denmark, investigations into wages were conducted in 1872 and 1882. These inquiries were directed by the Ministry of the Interior, and by the Statistical Bureau of Copenhagen, but the results were not at all noteworthy.[6] In Italy, also, two attempts have been made to secure statistics of wages, and the results have been published by the Director of Statistics.[7] But no department of labor statistics has been established.

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[1] See Handwörterbuch der Staatswissenschaften, Supplementband, i, 146, 147 ; *Archiv für sociale Gesetzgebung und Statistik*, v, 146 ; *Bulletin of United States Department of Labor*, i, 108. The reports of the German Commission have been summarized in the *United States Labor Bulletin*, i, 409–411 ; iii, 73–75. See also *Publications of American Statistical Association*, iii, 213–219.

[2] *Statistische Monatschrift*, 1892, 113–128.

[3] *Archiv für sociale Gesetzgebung und Statistik*, vii, 306–316.

[4] *Journal of Royal Statistical Society*, lviii, 650–651 ; *Zeitschrift für Volkswirthschaft, Socialpolitik, und Verwaltung*, v, 1–61.

[5] Upon October 1, 1898, a Bureau of Labor Statistics was established in Austria, in accordance with an imperial decree of the previous July. The object of this office is a "systematic collection and preparation of statistical data relating to labor." See the *Quarterly Journal of Economics*, xiii, 230–231.

[6] *Bulletin de l'institut international de statistique*, 1892, part i, 195–199.

[7] L. Bodio : in *Annali di Statistica* ; Fourth Series, 14 and 26. *Quarterly Journal of Economics*, vi, 153–154, 188. *Statistische Monatschrift*, xv, 339.

In Canada and Australasia, official statistics of wages have been published.

The Canadian census has investigated manufacturing industries in much the same way as the United States census. In 1891 returns were secured from 75,968 establishments, employing 370,256 hands.[1] These hands included 273,424 men and 96,832 women and children. Ascertaining the total wages paid, the census takes as a divisor the number of hands employed, and arrives at an average rate of wages. The Statistical Year-Book shows the results by provinces. As a rule, a substantial increase appears when the returns for 1890 are compared with those for 1880. But the Canadian statisticians do not approach our own census takers in ability to figure out higher rates of wages. In one province the Canadian census showed an increase of only one dollar, while in the Northwest Territories a decrease of twenty dollars was shown. These results are very tame when compared with those achieved in the Eleventh Census of the United States. Besides the Canadian census, mention should be made of the Reports of the Bureau of Industries of the Province of Ontario. These have appeared since 1883, and have been included in the Report of the Ontario Department of Agriculture since 1887. They have investigated especially the wages received by farm laborers and domestic servants, but have included other kinds of laborers.[2] The classified presentation of rates of weekly wages has been employed extensively.

In New Zealand, official statistics of wages are found as early as 1882. They have been continued from year to year, and now give average rates of wages in various trades, classified by districts.[3] The Year-Book of Victoria gives average rates of wages paid in Melbourne.[1] These tables present merely maximum and minimum rates, which show wide differences. Hence they might show no change even if the wages paid to the majority of laborers should alter, for they do not give the number of hands employed at specified rates of wages. The Year-Book for 1891 gives similar data that reach back to 1880.

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[1] Census of Canada, 1890–1891, iii (Ottawa, 1893). See also the Statistical Year-Book of Canada, 1895, pp. 198, 202, 203, 212, 216, 219, 223, 229, 232, 236, and especially 237.

[2] See *Quarterly Journal of Economics*, vi, 170, 171. *Bulletin of the United States Department of Labor*, i, 291–294; ii, 614–615. Davidson: The Bargain Theory of Wages, 210–212.

[3] Statistics of the Colony of New Zealand, 1895, pp. 241–242. The writer has been unable to secure publications prior to the year 1882.

In New South Wales, T. A. Coghlan has published interesting tables of weekly wages, classified by occupations and sub-divisions of occupations.[2] The reports show the maximum and minimum rates of payment in each case, and appear to be actual quotations, not averages; but the tables do not show the number of hands employed at each rate. This is a serious omission, for great differences are shown between the highest and lowest wages paid. In another work[3] Mr. Coghlan gives a large body of wage statistics that reach back even as far as 1823. Among other things, a table of classified weekly wages from 1872 to 1886 is presented for thirty-two different occupations; while much information is given concerning prices and the cost of living.[4]

III. OFFICIAL INVESTIGATIONS OF WAGES IN THE UNITED STATES.[5]

As is well known, the various labor bureaus in the United States have conducted many investigations into the statistics of wages. The Reports of the Massachusetts Bureau of Labor contain from the outset data relating to this subject. We may begin with the Report for 1882, which gave average weekly wages, classified by occupations, for the years 1860, 1872, 1878, and 1881.[6] In 1883 the Report covered the wages paid and the average number of hands employed in eighty industries.

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[1] Year-Book of Victoria, 1894, pp. 571–574.

[2] New South Wales Statistical Register, 1896, pp. 504–514.

[3] Wealth and Progress of New South Wales, Tenth Issue, 1895, pp. 422, 432–433, 441–442, 452–453, 458–459, 467, 471–472, 476–477, 479, 480.

[4] Wealth and Progress of New South Wales, 467, 480–483.

[5] In this article no mention will be made of statistics of wages in the federal census. That subject has been treated by the writer in the *Publications of the American Economic Association* (1899).

[6] Of the earlier Reports see those for the years 1874, 1876, and 1879.

In the next year an attempt was made to ascertain the average rate of wages in Massachusetts, and to compare this rate with the wages paid in Great Britain. Returns were secured of the wages of 35,900 laborers in Massachusetts.[1] These formed about ten per cent of the employees of the twenty-four industries that showed a product equal to seventy-five per cent of the total industrial product of the state. Quotations were gathered from pay-rolls by agents of the Bureau, and the wages were classified according to the age and sex of the laborers. The method employed in computing the average wages was as follows. First, the bureau ascertained the average wages in each sub-division of each occupation, excluding unusually high or low quotations. Thus a valuable average of the wages paid to a group of laborers of nearly the same grade of skill was secured. Second, the Report determined the average weekly wages of all men, of all women, and of all children, in each industry. Such averages are less useful, since by averaging the wages of all the men or women in each industry we average the wages of all grades of labor, skilled and unskilled; and the result may be an average that is wholly unreal, not representing the actual wages paid to any considerable number of operatives. When wages varying from $6.00 to $30.00 per week are averaged, as was done in the cotton industry, the result is not likely to represent the actual earnings of the mass of the laborers included. In the worsted industry the wages varied from $3.00 to $38.40. In the third place, the Report combined these average wages of men, of women, and of children, and computed the average weekly wage for each industry. Such a procedure resulted in an average that was almost useless, if not actually misleading. Of course these averages were highest in those trades where the smallest number of women and children were employed. The building trades showed an average of $14.99, and the cotton manufacture one of $6.45. In the first industry only men were employed; while in the second there were 1728 men and 5783 women and children. The average wage of $6.45, reported for the cotton industry, can, manifestly, give no certain information concerning the earnings of men employed at such work. Finally, the wages in each industry were combined into an average weekly wage for all industries, and the resulting average was then compared with the English wage statistics. The average weekly wages were stated as $10.31 for Massachusetts and $5.86 for Great Britain. Such a combination of averages of the wages of men, women, and children was most unfortunate.[1] But the Report made other comparisons that were of more value. Perhaps the most interesting of these was a table showing the number of occupations in each country paying each rate of weekly wages.[2] This table separated men, women, and children. From it one can see at a glance that about ninety per cent of the occupations in which men are engaged in Great Britain pay less than $10.00 per week, while more than sixty per cent of such occupations in Massachusetts pay over $10.00 per week.

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[1] This Report has been carefully criticized in the *Political Science Quarterly*, i, 71–78.

The Report of the Bureau for 1885 gave a historical review of wages from 1752 to 1860. But this must be passed over in order to speak of the investigations conducted in connection with the state census of 1885.[3] This census made extensive inquiries into wages and earnings, and investigated the relation of wages to the cost of production. The total wages paid and the total number of employees were ascertained, and an average wage of $351.02 for the entire state was computed.[4] The number of hands enumerated was the total number present at any time during the year, not the average number employed. But the valuable feature of the census was the table of classified weekly wages.[1] These returns may be conveniently studied in the Report of the Labor Bureau for 1889. Here one finds returns of the weekly wages actually paid to 248,200 employees, nearly two-thirds of the total number engaged in manufacturing and mechanical pursuits.[2] The results are well classified,—(1) by industries; (2) by the sex of the employees; (3) by the amounts of weekly wages received. These tables then show: (1) the number of males and females receiving each specified rate of wages, from $5.00 and less up to $20.00 and over; (2) the per cent this number bears to the whole number of laborers for whom returns were received. The data thus presented would have a greater value for statistical purposes if the classification had distinguished between the wages of children and of adults. We are told[3] that a large proportion of those males who receive less than $7.00 per week are minors, and that many of the females that receive less than $5.00 per week are minors. But this is not sufficient for purposes of exact comparison between wages in one industry and those paid in another. The Report on Manufactures[4] shows the ages of the persons employed in each industry. By combining these data, with the classified wage tables, the careful student can make available a large mass of valuable wage statistics.

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[1] Mr. Wright defended this use of averages in an article in the *Quarterly Journal of Economics*, vi, 178-179.

[2] See pp. 306-308, Report for 1884.

[3] Census of Massachusetts, 1885, vol. ii, Manufactures, Fisheries, and Commerce.

[4] Census of 1885, vol. ii, p. *ci*.

In 1886 annual statistics of manufactures were authorized, in order to secure the prompt publication of simple and comparable data concerning the principal industries of the state. It was desired also to guard against possible errors in comparisons drawn from decennial censuses, some of which are likely to be taken in abnormal years. The annual Reports on Manufactures have contained much information of interest to the student of wage statistics. The most valuable features from this point of view have been the tables of classified weekly wages, constructed upon a plan similar to that adopted in the census of 1885. The continued publication of such data year after year will surely build up a mass of incontrovertible facts concerning the course of wages in Massachusetts. Of much less value are the tables presenting the average annual earnings of all the employees in each industry, and in all industries.

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[1] See especially census for 1885, ii, pp. *cii–civ*.

[2] Report of Bureau of Statistics of Labor, 1889, 410–430.

[3] Report of Bureau of Statistics of Labor, 1889, 432.

[4] Vol. ii, 1086–1089.

Important statistics have been published in the Reports of the Bureau of Statistics of Labor since 1889. Chief among these is the Report for 1895, which presents tables of graded weekly wages, gathered from many different publications. Besides the reports of labor bureaus in other states, the United States census of 1880 and the consular reports of the United States have been drawn upon. In all, 430,900 wage quotations are given. In examining the Report one is struck by the fact that the materials presented are of very unequal value. In particular, it seems unfortunate that the Massachusetts Bureau should have utilized, in comparative tables, data taken from reports by our consuls. In 1896 the Report of the Bureau continued these tables of graded weekly wages, and also published data relating to wages paid in 1891. The Report for 1897 contains an investigation of comparative wages and prices for the years 1860, 1872, 1878, 1881, and 1897.[1] Particular comparisons are made of wages paid in 1872, 1881, and 1897. For this purpose the average rate of wages is computed for each industry, the quotations for each branch of employment being given an importance proportionate to the percentage which the number of persons so occupied bears to the total number engaged in the entire industry. Between 1872 and 1897 seven industries show a decrease in money wages, and four show an increase. Between 1881 and 1897 eight industries show a decrease, and fifteen show an increase. The results vary widely in the different industries. Between 1872 and 1897, for instance, the variation ranges from a decrease of 21.97 per cent up to an increase of 68.92 per cent. Between 1881 and 1897 the maximum variation is from a decrease of 34.47 per cent up to an increase of 43.91 per cent. Such wide differences in the results justify a doubt whether the statistics are based upon observations sufficiently numerous to support a valid average for the entire manufacturing industry of the State. In two instances the results are somewhat peculiar. The wages of agricultural laborers who were furnished with board increased 2.78 per cent; while the remuneration of similar laborers whose wages did not include board decreased 8.76 per cent. Does this willingness of farm laborers to accept lower wages, when food and lodging are not included, indicate a progressive deterioration in the quality of the hired man's board since the Crime of 1873?

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[1] Twenty-Eighth Annual Report of the Bureau of Labor Statistics, 1–42.

During the last year the state census for 1895 has been published. This included an investigation into the average wages paid in manufacturing industries. It ascertained the average, the smallest, and the largest number of hands employed during the census year. Then it divided the total amount paid in wages by the average number of employees, and computed an average wage of $446.41.[1] In a similar computation the census of 1885 used as a divisor the total number of hands employed at any time during the year, and computed an average wage of $351.02. Of course the results of the two censuses are, for this reason, wholly incomparable; and, accordingly, the last census undertakes to make no comparison. The reader is wisely cautioned against attaching much importance to averages computed for a large body of laborers of different sexes and ages, as well as of different grades of skill; but it is unfortunate that persons who exploit official statistics are not expressly informed that no comparison can be made between the average rates of wages calculated in 1885 and those computed in 1895. In the absence of such a warning Mr. Michael Mulhall is almost certain to appear with a declaration that official statistics prove that wages in Massachusetts increased from $351 to $446 during the decade ending in 1895.

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[1] Census of Massachusetts, 1895, v, 235, 240, 280.

Of the work of the labor bureaus of other states much might be said,[1] especially in the case of the earlier reports of the Connecticut Bureau. The Connecticut Report for 1888 gives an interesting table of yearly earnings of various classes of employees grouped by industries. The number of quotations is fairly large, and the classified results are of much interest. It presents, also, statistics of classified wages paid during the last week of June, 1887. The data for the Report were secured by special agents of the bureau. The reports of recent years[2] have contained statistics of manufactures, and have deduced average yearly earnings of laborers from data concerning total wages paid and the number of hands employed. In 1896 there was published a table showing the highest and lowest wages paid in each industry to men, women, boys, and girls.[3] These statistics illustrate well the unreal and misleading character of an average wage, even for all men in the same industry. In one instance the daily wages paid to men varied from a minimum of $0.50 to a maximum of $6.00. Finally, the Report for 1897 gives the results of an investigation into the condition of workingmen. It was based upon returns secured from 200 laborers, divided into seven groups "of as nearly the same degree of efficiency and capacity for earnings as was considered to be the average throughout the State."[4] But almost every group showed the widest differences in the earnings of its members.

In a number of other states the use of tables of classified weekly wages has been introduced.[5] A continuation of this method of presenting results will gradually furnish us with a large body of comparable wage statistics.

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[1] *E. g.*, see *Political Science Quarterly*, i, 66–83 ; *Quarterly Journal of Economics*, vi, 164–183.

[2] See Report of Connecticut Bureau of Labor Statistics, 1896, 293, 294, 295, 306, 307.

[3] See p. 308.

[4] See p. 20.

[5] Report of New Jersey Bureau of Statistics, 1896, 82–98 ; Report of Illinois Bureau, 1892, 156–234 ; Report of Wisconsin Bureau, 1896, 360–361,

The United States Department of Labor was established by a law approved June 27, 1884. Its annual reports have contained many special investigations into wage statistics. It is not necessary to attempt any summary of these publications[1], but it is desirable to emphasize two features of the work of the Department of Labor. The investigations have been conducted by trained special agents; and wage statistics, whenever presented, have been classified with care, so that useful data have been secured.

Besides the publications of the Department of Labor, various other investigations into wage statistics have been conducted under the authority of the United States government. In 1875 Edward Young submitted a special report upon "Labor in Europe and America." In 1879 and 1885 there appeared two series of reports by American consuls upon wages in foreign countries.[2] The materials here presented, even when they may be considered trustworthy in themselves, are a mass of incomparable data which are of little value for statistical purposes. Yet it should be said that in Mr. Young's report, and in those of some of the American consuls, much honest and trustworthy material may be found.

In 1882, upon the request of Congress, Mr. Joseph Nimmo prepared a report upon wages in the United States and in other countries.[3] This document is remarkable for what Mr. Nimmo carefully refrained from doing. He frankly stated that his materials were not satisfactory, and that he could not undertake any extensive comparisons of American and foreign wages, because comparable data could not be secured for that purpose. Such self-restraint upon the part of an official statistician, who had the resources of the government printing office at his command, is certainly worthy of passing notice.

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[1] See especially the Fourth Report for "classified yearly earnings" of working women in cities; the Fifth Report for statistics of "time and earnings of railway employees," with most elaborate classifications; the Eleventh Report on work and wages of men, women, and children in the same occupations.

[2] The State of Labor in Europe (Washington, 1879); Labor in Foreign Countries (Washington, 1885).

[3] Comparative Rates of Wages in the United States and in Foreign Countries. Miscellaneous Publications of Treasury Bureau of Statistics (Washington, 1882).

In 1892 the statistician of the Department of Agriculture published the results of an investigation into the wages of farm labor in the United States.[1] The statistics were most complete from 1866 to 1892, although some quotations reached back to the year 1840. They are based upon an extensive system of averaging that was described as "very consistent, and in a high degree trustworthy and convincing." In the case of farm wages, where greater uniformity prevails than in the wages of factory operatives, such a use of averages may be admissible. The investigation showed high rates of (currency) wages after the Civil War, followed by a decline that reached its lowest point in 1879. Then wages seem to have risen to "a normal status, which has been maintained with wonderful uniformity during the last ten years."

Perhaps our best known and most widely quoted collection of official wage statistics is the Aldrich Report on "Wholesale Prices, Wages, and Transportation," published in 1893.[2] This contains an investigation into wages in the United States from 1840 to 1891. The Report states that these statistics represent "twenty-two more or less distinct industries,"[3] and it presents data gathered from eighty-eight establishments. "The wages in January, 1860, are taken as the basis, and subsequent wages are calculated as percentages of the same."[4] In this manner there were secured tables of relative wages in each industry, and the average wages for all industries during the period in question.[5] The simple average for all industries showed an increase in wages amounting to 60.7 per cent from 1860 to 1891, while a weighted average indicated an increase of 68.6 per cent. Between 1880 and 1891, the simple average for all industries showed an increase in relative wages from 141.5 to 160.7; while the weighted average gave in increase from 143 to 168.6.

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[1] J. R. Dodge: Wages of Farm Labor in the United States, 1840–1892. Reports of Division of Statistics, Miscellaneous Series, No. 4 (Washington, 1892).

[2] Senate Report 1394, 52nd Congress, 2nd Session (Washington, 1893).

[3] This was a misprint obviously, for the tables show that 21 industries were investigated. See Report, i, 172–174.

[4] Report, i, 110.

[5] Report, i, 111–177.

The Report includes, also, some statistics gathered by Mr. J. D. Weeks for the coal, iron, glass, and pottery industries.[1] These data were collected by a somewhat different method, and consequently were not averaged with the statistics first mentioned. It is claimed, however, that they "conform in the main with the results of the general investigation into wages."[2] It is true that Mr. Weeks's statistics show, in most cases, a material increase in wages since 1860; and, to that extent, confirm the results of the Report. But, from 1880 to 1891, Mr. Weeks's figures show practically no increase in wages;[3] while the Report indicates a very material increase for this period of eleven years.

The Report does not include any investigation into the wages of farm laborers. Efforts were made to secure such data from Mr. Dodge, who had published in 1892 the results of his inquiries upon this subject; but it was found to be impossible to secure enough quotations for any data prior to 1866. This was unfortunate, for Mr. Dodge's statistics of farm wages from 1866 to 1891 do not conform to the results indicated for the industries covered by the Aldrich Report. Mr. Dodge showed that farm wages had remained practically stationary since 1882, and that gold wages were about the same in 1892 as they had been in 1866.[4]

The Aldrich Report gathered statistics concerning 21 industries. But in four of these the quotations were not used for various reasons.[5] In the 17 industries finally used as the

[1] Report, i, 181-184.

[2] Report, i. 184.

[3] Following the same methods of averaging that are used in the Report, Mr. Weeks's data show relative wages of 156.2 in 1880, and 156.5 in 1891.

[4] Wages of Farm Labor in the United States, 7-9.

[5] The industries not finally included were groceries, ginghams, spice, and sidewalks. Report, i, 175.

basis for the investigation, there were employed 1,945,000 persons, as shown by the tables of occupation of the census of 1880.[1] These laborers formed about 11 per cent of the whole number of persons engaged in gainful occupations in the census year. In the 17 industries quotations were gathered from 84 different establishments. But in several establishments the quotations did not reach back as far as 1860, so that they could not be utilized in the final summary.[2] As a result, the Report is based upon not more than 75 establishments selected from 17 industries. Moreover, in seven cases out of the 17, returns were secured from only one establishment, which must have been regarded as typical of the entire industry. In two cases, only two establishments were investigated; in two other cases, three establishments were selected; while three industries are represented by four establishments each. This left the stone industry represented by six establishments; the metal industry with 19 establishments; and the building trades with 21 establishments. More unfortunate still is the fact that all of the establishments investigated, with one exception,[3] were situated in a few states north of the Potomac and east of Ohio. An examination of the statistics in detail discloses the fact that the seven industries that are represented by a single establishment give results that vary considerably from the average for all industries.[4] For 1891 a simple unweighted average for all lines of business shows an increase of 60.7 per cent over the wages for 1860; but in these seven industries the 36 series of quotations secured show an increase of 70.56 per cent.[5] Some surprise also is occasioned by the discovery that the single dry goods establishment enumerated, in which the wages are taken as typical of the wages of the 353,444 clerks employed in stores in 1880, was located in New Hampshire. In this highly typical and average store, 14 clerks were employed in 1891, and wages increased 83.6 per cent between 1860 and 1891.[1]

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[1] Report, i, 175-176.

[2] In the seventeen industries the following establishments seem to have been thrown out for the reasons stated: Nos. 4, 11, 25, 30, 31, 32, 49, 63, and 64. Establishments, 43, 44, 77, and 78 were in the four industries that were wholly excluded.

[3] Establishment 48 was a gas plant situated in Ohio.

[4] On this point A. L. Bowley writes: "It is found that, if a diagram is drawn, representing by twenty-two lines the changes in the twenty-one industries and in the average, many of the lines diverge very far from the average line; and the most divergent are precisely those for which the figures depend on insufficient data." *Economic Journal*, v, 376.

[5] The data for this computation may be found on pp. 111, 112, 119, 135, 159, 160, 165 of the first volume of the Report.

It appears, therefore, that the wage statistics of the Aldrich Report rest upon a narrower basis than could have been desired if it was intended to serve as a guide to the general course of wages in the United States. As it stands, 17 industries and 75 establishments, situated in the same section of the country, furnished all the materials utilized. Five hundred and forty-three series of wage quotations were obtained for the period from 1860 to 1891.[2] But not all of these were complete for the entire period, and the number of complete series can not be much above 500.[3] For the basal year, 1860, it appears that the Report gives statistics for 6536 laborers, who earned the sum of $7,771.17. In 1891 data are presented concerning 8290 persons, who received $15,292.[4] These results we are asked to accept as typical for the United States.

The next criticism to be raised against the Aldrich Report concerns its choice of a base for its statistics of relative wages. The method adopted is explained in the following words:[5] "The wages in January, 1860, are taken as the basis, and subsequent wages are calculated as percentages of the same." Thus tables of index numbers are computed for all the series of quotations. The Report considers the strong theoretical objections that may be raised against taking the statistics for a single year as the starting point, but states that 1860 may be fairly considered a normal year.[1] This may be granted, and the objections may be waived; but the further difficulty arises that the Report does not secure average wages for 1860, and selects the quotations for a single month. This may have been unavoidable, under all the circumstances; but attention should be directed to this fact in a critical examination of the data here presented. The questions involved illustrate well the difficulties under which the collector of wage statistics necessarily labors.

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[1] Report, i, 173 ; iii, 857-863.

[2] The period 1840 to 1860 is covered by only sixty-one series, gathered from only eight or nine industries, many of which are represented by a single establishment. See Report, i, 110, 111-171.

[3] Mr. F. C. Waite states that thirty-one series are blank for the year 1860. See Prices and Wages, 9 (Washington, 1894). Forty-one series of quotations are included in the four industries omitted from the final calculation. If the Report included these in its list of five hundred and forty-three, the number of series actually used is considerably less than five hundred.

[4] See the computations by A. L. Bowley in the *Economic Journal*, v, 373.

[5] Report, i, 110.

As a rule, the Report seems to have used the January wages for each year, and to have neglected the July quotations, which were secured whenever possible. But this is not always the case. With the wages of bricklayers and quarrymen, and perhaps some other laborers, the July wages were used.[2] This has been explained upon the ground that, with these classes of laborers, the summer wages were regarded as a fairer basis for comparison.[3] Upon the same principle, the Report, in its statistics of prices of commodities, usually selected the January quotations; but, with such articles as fresh vegetables, used the prices for other months.[4] The writer can express no opinion concerning the question whether the January or the July quotations are better suited to the purpose of ascertaining the course of wages in occupations where employment is somewhat dependent upon the seasons. Neither can he ascertain the number of series in which the July wages have been followed, and the results of selecting these rates rather than those paid in January.[1] But it seems unfortunate that such an element of uncertainty should have been left in the Report.

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[1] Report, i, 28.

[2] See the bricklayers, and their helpers in establishments 12, 22, and 26; also the quarrymen in establishments 79 and 80; the carpenters in establishment 7; and the masons in establishment 9.

[3] The writer may quote from a letter received from the Statistician of the Report: "If in some cases where January and June wages were equally available, the latter were chosen, it was because . . . . the summer wages were regarded as distinctive rather than the winter wages. I think this is true of bricklayers."

[4] Report, i, 29.

In at least two other cases the January quotations were not strictly followed. In establishment 6, the quotations for press feeders begin in July, 1861, with a single employee, who received 33 cents per day. This was clearly an abnormal rate, since by January, 1862, it had been raised to 50 cents; while no rate lower than 50 cents appeared in any following year.[2] The series should have begun with January, 1862; but the July quotation of the previous year was selected, and the rate of increase was greatly exaggerated as a consequence. In the second case a more serious error was made. Boiler makers' apprentices, in establishment 68, are credited with wages of 37.5 cents in January, 1860, and with wages of 43.5 cents in July of the same year. In 1891 they received 75 cents in January and 77.5 cents in July. The Report evidently selected the quotation for January, 1860, the lowest rate for that year, and the quotation for July, 1891, the highest for the latter year. Thus these laborers were credited with an increase in wages of 106.7 per cent, which represents the difference between 37.5 cents and 77.5 cents.[3] This computation, although it results in only a slight exaggeration of the rate of increase from 1860 to 1891, is enough to shake one's confidence in the accuracy with which the materials were handled. In the rest of the 500 series no similar error may occur. But the tables, as they stand, are open to reasonable suspicion of error.

One other point must be noted in this connection. About 30 series of quotations seem to be blank for 1860. In such cases the wages paid in 1859, 1858, 1857, 1856, and 1861 were taken as the starting point; and the wages for 1891 are computed as percentages of such a base. This may not have caused any great error in the final result, but it is at least an uncertain element in the Report.

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[1] In ten series, where July wages were used, the writer found some cases in which the January wages gave the same per cent of increase from 1860 to 1891 as was computed from the July figures. In other cases the January rates gave sometimes smaller and sometimes larger rates of increase than were indicated by the wages for July.

[2] Report, ii, 386.

[3] See Report, i, 147 ; iii, 1221–1222.

The next criticism of the Report concerns the methods adopted in the computation of average wages for each year. The ordinary method of averaging wage statistics is to divide the total amounts paid in wages by the total number employed. If our statistics included all laborers in a community, we could deduce with perfect accuracy an average wage for the community. Such an average would be arithmetically correct, although it might not be typical of the conditions under which the mass of the laborers actually lives. For this last purpose the classified wage table is better. But, obviously, such completeness can not be secured in our investigations, and the question immediately arises: How shall our data be handled so as to make them as typical as possible of the wages received by the entire class of wage earners? If the classified table is adopted we present an actual picture of the concrete conditions of living of that fractional part of the laboring population whose wages have been investigated. The results will have more or less significance according to the confidence that can be placed in the fairness with which the data were gathered, and according to the comprehensiveness of the enumeration. The more common method, however, has been to compute an arithmetical average of wages paid to the groups of laborers under consideration, and to take this average as typical of the earnings of all laborers. When this is done it is evident that, in the determination of the average, each separate wage quotation is given an importance proportional to its size, because the higher rates of wages affect the average much more than the smaller rates can affect it. Such a mode of procedure results in giving the several wage quotations an arbitrary weighting, and the average wages thus computed may not be representative of the average remuneration of all workers in the community, for the reason that the investigation may have included an undue proportion of high-priced or low-priced laborers. It is sometimes possible, however, to make allowance for such errors. Within each industry the separate quotations for each distinct employment may be weighted by a weight corresponding to the proportionate number of persons in such employment, when the data necessary for such a computation are at hand. In the next place the quotations may be grouped by industries, and the results for each industry may be given an importance corresponding to its rank in the community.

A third method is the use of index numbers, the expedient employed in the Aldrich Report. If the wages quoted for each laborer should be converted into an index number, and an average computed, the consequence would be to give to each separate quotation precisely the same importance in determining the final result that is given to any other quotation. Such a weighting of the figures would be just as arbitrary, as to give each quotation an importance proportional to its amount in dollars and cents, which we have seen to be the result of computing a simple arithmetical average of all the quotations. Data secured by computing a separate index number for each quotation should be corrected by devising a system of weighting that would give each index number a weight proportional to the importance of the industry and the branch of employment represented.

But the Aldrich Report does not construct separate index numbers for all quotations. Within each establishment the laborers in each branch of employment form a series. Thus, in establishment 42, three series of quotations were secured. One series represented the wages of one porter, the second represented the wages of seven salesmen, and the third represented the wages of six saleswomen. Within the various series it oftened happened that different rates of wages were received by the different laborers. In such cases the Report determined the arithmetical average, and made this the basis for the series. When the Report undertook to group the wage quotations in series, it introduced into its computations an entirely arbitrary system of weighting. Many of the 500 series represent the wages of a single man, while others represent the wages of groups that include scores and even hundreds of workmen. In averaging the quotations, therefore, it is evident that the importance given to the wages paid to each individual laborer varied inversely as the number of persons included in the series to which he belonged. Where 20 men are included in a series, the quotation for each man receives $\frac{1}{20}$ of the weight that is given to another series that represents the earnings of a single workman. We may, then, lay down the general rule that the Aldrich Report gave to the quotation representing the wages of any single laborer an importance that varied inversely with the number of persons engaged in his branch of employment. It would seem that a very different method ought to have been adopted, if it was desired to make the results obtained by a study of the six or eight thousand laborers included in the Report typical of the conditions existing in the entire country. In the Twenty-Eighth Annual Report of the Massachusetts Bureau of Labor Statistics a somewhat similar problem arose. The Bureau took pains to determine the relative importance of each branch of employment within each industry, and to give to the average wages computed for each branch a weight proportioned to its importance in the entire industry. This is precisely the reverse of the method employed in the Aldrich Report, and both methods can hardly be correct.

In the subsequent weighting of the index numbers for the 500 series this error was not corrected. The series of index numbers for each industry were given a weight proportional to the importance of the industry, as indicated in the Tenth Federal Census. Thus the same weight was given to a series representing one man as was given to a series representing 100 common laborers in the same establishment. In one instance a single brewer, who received $6.39 per day in

1860, and $23.96 in 1891, is given as much importance as seven coopers in the next series, or five foremen laborers in the third series, or 41 common laborers in the fourth series, or 10 teamsters in the last series.[1] Since these quotations were all secured in the same establishment, each series was given equal weight in determining the weighted average for all industries. It will be worth while to take another example in which the series selected for our study are drawn from different industries. This typical brewer, who received over $6000 per year, and was certainly worth that amount as a subject for statistical investigation, counted for as much in determining the simple average as 133 laborers who were included in a single series in establishment 48.[2] The brewer's wages increased 275 per cent between 1860 and 1891. The wages of the 133 laborers increased 29.5 per cent. The Report has adopted a method of averaging that gives equal weight to each of these series, and figures out a simple average increase of 152.25 per cent for the 134 workmen. In computing the weighted average for all industries the Report makes a bad matter worse. The industry in which the brewer was employed is given a weight of 16, while that in which the 133 laborers were engaged receives a weight of 5.[3] Such a method of weighting made the brewer simply invaluable for statistical purposes.

This is, of course, an extreme instance; but there are others that are nearly as bad. In some cases, however, the series that contain but one man show lower rates of increase than those that contain many more employees. But, in general, it may be said that the "one man" series include many such persons as foremen and overseers, whose wages are subject to considerable increase, by reason of greater efficiency, or by reason of the growing demands which the increasing complexity of the business may make upon the holder of such a position. The wages of such workmen would be likely, over a period of 31 years, to show a greater rate of increase than would hold true in the case of other grades of laborers.

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[1] These are the numbers employed in January, 1891. See Report, i, 112; ii, 312–329.

[2] Report i, 141; iii, 931.

[3] Report, i, 176.

In order to determine the nature of the influence which these "one man" series exercised upon the final result, the writer made an examination of all such cases. There are not less than 117 "one man" series in the Report. This is much more than $\frac{1}{5}$ of the whole number. From 1860 to 1891, according to the methods of averaging adopted in the Report, these 117 series show an increase of wages that is about 12 per cent greater than the figures computed for all industries.

The methods employed by the Report, in computing the weighted average, are open to further objection. We have already seen that seven industries out of the 17 investigated were represented by a single establishment. This was undoubtedly an inadequate basis of observation, and it can not be claimed that an average wage computed from such materials is necessarily or even probably typical of these seven industries. The insufficiency of the data is truly startling. According to the census of 1880 these industries employed nearly 685,000 hands.[1] From this number the Report secured only 38 series of quotations,[2] which included only 633 workmen in the year 1891. This was considerably less than $\frac{1}{10}$ of one per cent of the total number of hands employed in these seven industries in 1880, and a still smaller percentage of the number engaged in 1891. What possible assurance have we that these data, gathered in the four states of New Hampshire, Massachusetts, New York, and Pennsylvania, are typical for all the employees engaged in these occupations throughout the country? Now when we average the rates of wages attributed to these seven industries, according to the methods followed by the Report, it appears that the 38 series of quotations show an average increase of wages amounting to 70.5 per cent, between 1860 and 1891. The simple average that the Report claims for the 17 industries is 60.7 per cent.

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[1] Report, i, 175.

[2] Report, i, 111, 112, 119, 135, 159, 160, 165.

This fact is of significance in two ways. Since the results for these industries, represented by insufficient data, diverge so considerably from the results indicated in other industries, where the enumeration was more comprehensive, we have a positive reason for suspecting that the establishments selected were not typical of the industries to which they belong. In the second place it is probable that the inclusion of figures based upon insufficient data resulted in an exaggeration of the rate of increase of wages between 1860 and 1891, when the Report computed a simple average for all industries. The matter was made still worse when the weighted average was calculated. These seven industries were then given weights that aggregated 684 out of a total weighting of 1945 that was applied to all industries.[1] This performance exaggerated still more the rate of increase between the years 1860 and 1891.

In view of the foregoing facts, three conclusions seem to be warranted. First, it is clear that the Report does not present sufficient data for determining with certainty the course of wages in the United States. Our great industry, agriculture, is not represented at all; and the statistics used in computing the average wage for all industries relate, for the year 1891, to only 8290 laborers, employed in 75 establishments situated in the same section of the country. In the second place, the base from which percentages of increase or decrease are calculated consists of quotations for a single month. This month is not always the same; and in some cases the year selected is not 1860, but some previous or succeeding year. In at least one instance a gross error was made at this point in handling the materials. Finally, the methods employed in determining the average wage for all industries weighted the quotations in an erroneous manner; and the result of the errors was always the same, *viz.*, to exaggerate the rate at which wages increased between 1860 and 1891. While a study of the actual quotations will convince the reader that there has been a very material increase of wages in these 75 establishments since 1860, it is impossible to accept the computations of the Report concerning the rate of increase. A simple arithmetical average of the wages paid to the 6536 persons enumerated in 1860, and to the 8290 persons enumerated in 1891, shows an average wage of $1.19 in the former year, and a rate of $1.84 in the latter.[1] The ratio of these averages is 100 : 155.4. The Aldrich Report computes a ratio of 100 : 160.7 by a simple average, and a ratio of 100 : 168.6 by the use of a weighted average. While it is possible that the data might be handled by a better method[2] than the calculation of a simple arithmetical average, it seem entirely certain that the Report did not succeed in its attempt to accomplish such a result.

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[1] Report, i, 176.

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[1] See computations of A. L. Bowley in *Economic Journal*, v, 373.

[2] Mr. Bowley, in the article above mentioned, attempts to find such a method.